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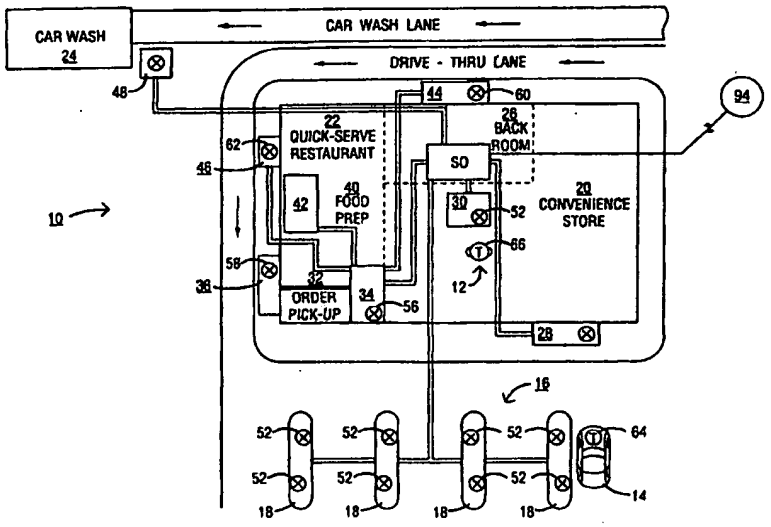

(57) Abstract

The present invention is to provide a multistage ordering system for a fueling environment (10). The system may include a fuel dispenser (52) having an order entry interface (186) and associated first remote communications electronics (60) adapted to communicate with a remote communications unit associated with the customer. An order receipt position apart from the fuel dispenser is provided and includes a second remote communications electronics (58) adapted to communicate with the remote communications unit, a receipt position output indicating the customer who placed the order is at the order receipt location. An intermediate locating position (208) located along the path of travel between the fuel dispenser and the order receipt position may also be provided.

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A FORECOURT ORDERING SYSTEM FOR FUEL AND SERVICES AT A FILLING STATION

Background of the Invention

The present invention relates generally to a forecourt ordering system fuel dispensers and, more particularly, to fuel dispensers and systems capable of communicating with various types of transponders and detecting their movement within and throughout a fueling environment.

In recent years, traditional gasoline pumps and service stations have evolved into elaborate point-of-sale (POS) devices having sophisticated control electronics and user interfaces with large displays and touch-pads or screens. The dispensers include various types of payment means, such as card readers and cash acceptors, to expedite and further enhance fueling transactions. A customer is not limited to the purchase of fuel at the dispenser. More recent dispensers allow the customer to purchase services, such as car washes, and goods, such as fast food or convenience store products at the dispenser. Once purchased, the customer need only pick up the goods and services at the station store or the outlet of a vending machine. Remote transaction systems have evolved wherein the fuel dispenser is adapted to communicate with various types of remote communication devices, such as transponders, to provide various types of identification and information to the fuel dispenser automatically. Given the sophistication of these transaction systems and the numerous choices provided to the customer at the dispenser, conducting transactions with transponders will be useful to

allow the dispenser and fuel station store to monitor the movement of a person carrying a transponder and a vehicle having a transponder, enhance transaction and marketing efficiencies, and improve safety in the fueling environment.

Summary of the Invention

The present invention relates to monitoring a customer position throughout a fueling environment in order to associate orders placed at the fuel dispenser with a particular customer at an appropriate receiving point. The receiving point may be a quick-serve restaurant drive-thru terminal, a car wash terminal, or any other point adapted to receive products or services ordered at the fuel dispenser. In addition to associating the appropriate customer with the order being picked up, operators of a quick-serve restaurant (QSR) can monitor or detect the position of the customer in the drive-thru lane or elsewhere in the fueling environment to determine when to start order preparation. For example, during the fueling operation, the customer may decide to order a few items from a QSR menu at the dispenser. As the customer enters the order, the order is associated with the transponder carried by the customer or mounted on the customer's vehicle.

As an alternative to providing an order at an order entry interface on the fuel dispenser the order can be placed on an order interface located within a vehicle, which order can be associated with a fueling transaction relating to the vehicle while located at the fuel dispenser. The order interface can then transfer its order to a communication device on the forecourt either located at the dispenser or elsewhere on the forecourt. The following description relates

to embodiments where the order interface is located on the dispenser, but it will be appreciated that the order could equally be placed at an interface within the vehicle being fueled at the dispenser.

The customer may choose to pay for the order along with the fuel at the dispenser, at the order pick-up position, or at one of the in-store registers associated with the QSR or the convenience store. Assuming that the transaction was paid for at the dispenser along with the fuel, the customer will enter the vehicle and proceed to drive around the fuel station store along a drive-thru lane and pass a customer position monitor. As the customer approaches the customer position monitor, a drive-thru position interrogator will receive a signal from the transponder indicating the customer is at a known position in the drive-thru lane. At this point, a control system will alert the food preparation area to prepare the order and indicate to an order pick-up interface and controller the position of the customer in the drive-thru lane. Once the customer reaches the order pick-up window, the order pick-up interrogator will determine the presence of the customer transponder and associate the customer's order accordingly so that the drive-thru window operator can deliver the freshly prepared order to the correct customer.

Accordingly, one aspect of the present invention is to provide a multistage ordering system for a fueling environment. The system may include a fuel dispenser having an order entry interface and associated first remote communications electronics adapted to communicate with a remote communications unit associated with the customer. An order receipt position apart from the fuel dispenser is provided and includes a second remote communications electronics

adapted to communicate with a remote communications unit, a receipt position output indicating the customer who placed the order is at the order receipt location, and an intermediate location output indicating the customer is proximate said intermediate locating position. An intermediate locating position located along the path of travel between the fuel dispenser and the order receipt position is also provided. The intermediate locating position has a third remote communication electronics adapted to communicate with the remote communications unit. The control system is associated with each of the communications electronics.

The control system is preferably adapted to communicate with the remote communications unit through the first communications electronics when the remote communications unit is proximate a fuel dispenser, associated customer order placed at the order entry interface, and communicate with the remote communications unit through the third remote communications electronics when the remote communications unit is proximate the intermediate locating position. When the customer is proximate the intermediate locating position, the control system provides an intermediate location output in order to determine the location of the customer between the dispenser and order receipt location. The control system will again communicate with the remote communications unit at the order receipt location when the customer arrives to pick up the order. The control system will identify the order at the receipt location for the particular customer who placed the order at the order entry interface of the fuel dispenser.

Typically, the order receipt location is associated with a quick-serve restaurant wherein the

customer may order food or drink at the fuel dispenser and pick up the food order at the order receipt location. The order receipt location is further associated with an order preparation location having an order preparation output. The control system is also associated with the order preparation output and adapted to control the order preparation output to indicate the customer associated with the order is at the intermediate location wherein processing the order for the customer is effected when the customer is determined to be at the intermediate location.

The present invention solves the unique problems associated with keeping track of orders from a QSR in a fueling environment. In such an environment, orders for pick up at the drive-thru window, or within the store for that matter, may be placed in a different sequence than that in which they are actually picked up. The reason for the possible discrepancy in order placement and order pick-up arises because the orders can be placed at several locations, including the many fuel dispensers and the traditional order entry interface of QSR. In particular, those customer placing orders at the dispenser will most likely intermingle in the drive-thru line with those placing orders at the order entry interface. The present invention uses transponders to appropriately associate orders placed at different locations with the appropriate customer at a common pick-up location.

These and other aspects of the present invention will become apparent to those skilled in the art after reading the following description of the preferred embodiments when considered with the drawings.

Brief Description of the Drawings

FIGURE 1 is a schematic representation of a fueling and retail environment constructed according to the present invention.

FIGURE 2A depicts a vehicle having a vehicle-mounted transponder constructed according to the present invention.

FIGURE 2B depicts a personal transponder integrated into a debit/credit or smartcard constructed according to the present invention.

FIGURE 2C depicts a personal transponder integrated into key fob constructed according to the present invention.

FIGURE 3 depicts a fuel dispenser shown constructed according to the present invention.

FIGURE 4 is a schematic representation of a transponder having separate communication and cryptography electronics constructed according to the present invention.

FIGURE 5 is a schematic representation of fuel dispenser electronics constructed according to the present invention.

FIGURE 6 is a schematic representation of convenience store transaction electronics, including a transaction terminal, for a fueling environment constructed according to the present invention.

FIGURE 7 is a schematic representation of a quick-serve restaurant control system for a fueling environment constructed according to the present invention.

FIGURE 8 is a schematic representation of a car wash control system constructed according to the present invention.

FIGURE 9 is a schematic representation of a central control system for a fueling environment

constructed according to the present invention.

FIGURES 10A and 10B are a flow chart representing a basic flow of a multistage ordering process according to the present invention.

Detailed Description of the Preferred Embodiments

In the following description, like reference characters designate like or corresponding parts throughout the several figures. It should be understood that the illustrations are for the purpose of describing preferred embodiments of the invention and are not intended to limit the invention thereto.

As best seen in Figure 1, a fueling and retail environment, generally designated 10, is shown constructed according to the present invention. The fueling and retail environment provides customers 12 the opportunity to purchase fuel for their vehicles 14 as well as other goods and services, such as fast food and car washes. The fueling and retail environment 10 may include one or more of a forecourt 16, where the fuel dispensers 18 are located, a convenience or fuel station store 20, one or more quick-serve restaurants (QSR) 22, a car wash 24, and a backroom 26. The backroom 26 is generally the central control area for integrating or coordinating control of the dispensers 18, convenience store 20, QSR 22, and car wash 24.

The convenience store 20 typically includes an inventory of a wide assortment of products, ranging from beverages and foods to household goods. The convenience store includes a

transaction terminal or register 30, where a customer 12 may purchase convenience store products, fuel, car washes or QSR food.

The QSR 22 generally includes an order pick-up area 32 having a QSR transaction terminal or register 34 located within the convenience store and a drive-thru terminal and window 36. Depending on the application, the QSR transaction terminal 34 and drive-thru terminal 36 may be separated or integrated in any fashion. Usually, customers are able to place orders at the QSR transaction terminal 34 in the store as well as pick up orders in conventional drive-thru style at drive-thru terminal 36.

The QSR 22 may also include a food preparation area 40, a food preparation interface 42 for providing order instruction to QSR food preparers, a drive-thru order placement interface 44 for placing drive-thru orders in a conventional manner, and a customer position monitor 46 for determining the location or position of a customer in line to pick up a QSR order at the drive-thru window 36. Notably, the drive-thru and car wash lanes depicted in Figure 1 are designed to control the flow of traffic through the respective lanes and aid to ensure vehicles, and their respective transponders, pass by the various interrogation points in the fueling environment as desired.

The car wash 24 includes a car wash interface 48 that interacts with the customer and controls the automatic car wash system (not shown), which may be any suitable automatic car wash. Preferably, a customer 12 will be able to order a car wash at a fuel dispenser 18, at the transaction terminal or register 30 of the convenience store 20, at the QSR transaction terminal

34, or at the car wash interface 48 directly. Similarly, customers are able to order fast-food items from the QSR 22 from various locations in the fueling environment 10, including at the fuel dispensers 18, drive-thru order placement interface 44, and the in-store QSR terminal 34.

Although various overall system and control integration schemes are available, the four major parts of the fueling environment 10 -- forecourt 16, convenience store 20, QSR 22 and car wash 24 -- typically interface at the backroom 26 using a central control system 50. The central control system 50 may include any number of individual controllers from the various parts of the fueling environment 10 to provide overall system control and integration. The central control system 50 may interface with the fuel dispensers 18, transaction terminal 30, QSR transaction terminal 34 and the car wash interface 48. Preferably the drive-thru terminal 36, drive-thru order placement interface 44 and customer position monitor 46 directly interface with the QSR terminal 34 in order to integrate the QSR functions prior to interfacing with the central control system 50. However, those of ordinary skill in the art will recognize several control variations capable of implementing an integrated system. Additionally, an automated vending system 28 may also interface with the central control system 50 or directly with any one of the other areas of the fueling environment 10, such as the fuel dispensers 18, in order to allow a customer 12 to purchase products from the vending system 28 at a remote location.

The present invention relates generally to providing remote communications between the customer 12 or the vehicle 14 and various parts of the fueling environment briefly described above. In short, many areas within the fueling environment 10 will be equipped with

communication electronics capable of providing uni- or bi-directional communications with the customer or vehicle carrying a remote communications device. The communication electronics will typically include a transmitter for transmitting signals to the remote communications device and a receiver for receiving signals emanating from the remote communications device. The remote communications device may also include a receiver and transmitter. The transmitter and receiver of the remote communications device may separately receive and separately transmit signals in cooperation with an associated control system or may be configured so that the transmitter actually operates on and modifies a signal received from the communication electronics in the fueling environment 10. The latter embodiment encompasses traditional transponder-type communication systems wherein the remote communications device may be either passive or active.

For the sake of conciseness and readability, the term "transponder" will be used herein to describe any type of remote communications device capable of communicating with the communication electronics of the fueling environment 10. The remote communications device may include traditional receivers and transmitters alone or in combination as well as traditional transponder electronics adapted to respond and/or modify an original signal to provide a transmit signal. A transponder as defined herein may provide either unidirectional or bidirectional communications with the communications electronics of the fueling environment 10.

Likewise, the communication electronics associated with the various aspects of the fueling environment 10 will be called an "interrogator." An interrogator will generally include a

transmitter and receiver capable of communicating with a transponder as defined above. Please note that an interrogator, as defined herein, need not contain both a receiver and a transmitter for various aspects of the invention.

With the above in mind, the fueling environment 10 may include many interrogators of varying capability. These interrogators may include: dispenser interrogators 52, a store transaction interrogator 54, a QSR transaction interrogator 56, a drive-thru pick-up interrogator 58, a drive-thru order interrogator 60, and a drive-thru position interrogator 62. In addition to detecting the local presence of the transponder associated with a number of vehicles may be tracked throughout the fueling environment by one or more antenna arrangements as described in detail in the priority documents of the present application. As shown in Figures 2A, 2B and 2C, the dispenser interrogator 52 is generally adapted to communicate with vehicle-mounted transponders 64 and personal transponder 66. The personal transponder 66 may be mounted on a key fob 68, a wallet card 70, or any other device typically carried by the customer 12, as shown in Figures 2B and 2C. Figure 2A depicts a vehicle 14 having a vehicle-mounted transponder 64.

The levels of sophistication of the vehicle-mounted transponder 64 may vary drastically. The transponder 64 may be integrated with the vehicle's main computer and control system, or may simply be a sticker placed on a window or on another part of the vehicle. The transponder 64 may be active or passive, and may be adapted to either simply send out an identification number or carry out high-level communications and have the ability to process, store and retrieve information. Various features of the invention will be disclosed in greater

detail.

As best seen in Figure 3, a fuel dispenser 18 is shown constructed according to and as part of the present invention. The dispenser provides a fuel delivery path from an underground storage tank (not shown) to a vehicle 14, (shown in Figures 1 and 2A). The delivery path includes a fuel delivery line 72 having a fuel metering device 74. The fuel delivery line 72 communicates with a fuel delivery hose 76 outside of the dispenser 18 and a delivery nozzle 78. The nozzle 78 provides manual control of fuel delivery to the vehicle 14.

The dispenser 18 also includes a dispenser control system 80 having one or more controllers and associated memory 82. The dispenser control system 80 may receive volume data from the metering device 74 through cabling 84 as well as provide control of fuel delivery. The dispenser control system 80 may provide audible signals to an audio module and speaker 86 in order to provide various beeps, tones and audible messages to a customer. These messages may include warnings, instructions and advertising.

The dispenser 18 is preferably equipped with a payment acceptor, such as a card reader 88 or cash acceptor 90, along with a receipt printer 92. With these options, the dispenser control system 80 may read data from the magnetic strip of a card inserted in the card reader 88 or receive cash from a customer and communicate such information to the central control system 50 (as shown in Figure 1), such as the G-site controller sold by Gilbarco Inc., 7300 West Friendly Avenue, Greensboro, North Carolina. The central control system 50 typically communicates with a remote network 94, such as a card verification authority, to ascertain

whether a transaction proposed to be charged to or debited from an account associated with the card inserted in the card reader 88 is authorized.

The dispenser 18 will include one or more types of displays, preferably one or more alpha-numeric displays 96 together with a high-resolution graphics display 100. The graphics display 100 will generally have an associated key pad 102 adjacent to the display or integrated with the display to provide a touch interface. The dispenser may include an additional, auxiliary key pad 104 associated with the card reader 88 for entering secret codes or personal identification numbers (PIN's). Notably, the displays 96, 100 and key pads 102, 104 may be integrated into a single device and/or touch interface. The dispenser control system 80 is preferably comparable to the microprocessor-based control systems used in CRIND (card reader in dispenser) and TRIND (tag or transponder reader in dispenser) type units sold by Gilbarco Inc. under the trademark THE ADVANTAGE.

As noted, the dispenser control system 80 may include or be associated with dispenser communication electronics referred to as interrogator 52 for providing remote unidirectional or bidirectional communications between a transponder and the dispenser. These transponders may incorporate the Micron Microstamp"! produced by Micron Communications, Inc., 8000 South Federal Way, Boise, Idaho 83707-0006. Additionally, the dispenser 18 may include one or more antennas 108 associated with the dispenser interrogator 52.

Turning now to Figure 4, the preferred embodiment of a transponder is shown. Transponder communication electronics 110, adapted to provide remote communications with the various

interrogators, include a transmitter 114 and receiver 116 having associated antennas 118, 120. The transmitter 114 and receiver 116 operate to transmit and receive data to and from an interrogator. The communication electronics 110 may include a battery power supply 122, a communication controller 124 associated with a memory 126, having software 128 necessary to operate the communication electronics 110 and optional cryptography electronics 112.

Serial communications between the communication electronics 110 and cryptography electronics 112 is provided via the input/output (I/O) ports 130, 140 associated with the respective electronics. The communication electronics 110 provide a signal from a clock 132 to the I/O port 140 of the cryptography electronics 112. The cryptography electronics 112 include a controller 134, memory 136 and software 138 necessary to encrypt and decrypt data, as well as provide any additional operations. The memory 126, 136 may include random access memory (RAM), read only memory (ROM), or a combination thereof. Notably, the communication controller 124 and the cryptography controller 134 may be integrated into one controller. Similarly, the software and memory of the communication and cryptography modules may be integrated or embodied in hardware.

Figure 5 shows a basic schematic overview of the dispenser electronics wherein a dispenser control system 80 includes a controller associated with the memory 82 to interface with the central control system 50 through an interface 146. The dispenser control system 80 provides a graphical user interface with key pad 102 and display 100. Audio/video electronics 86 is adapted to interface with the dispenser control system 80 and/or an auxiliary audio/video

source 156 to provide advertising, merchandising and multimedia presentations to a customer in addition to basic transaction functions. The graphical user interface provided by the dispenser allows customers to purchase goods and services other than fuel at the dispenser. The customer may purchase a car wash and/or order food from the QSR while fueling the vehicle. Preferably, the customer is provided a video menu at the display 100 to facilitate selection of the various services, goods and food available for purchase. The card reader 88 and cash acceptor 90 allow the customer to pay for any of the services, goods or food ordered at the dispenser while the printer 92 will provide a written record of the transaction. The dispenser control system 80 is operatively associated with a dispenser interrogator 52, which has a receiver 142 and a transmitter 144. The receiver and transmitter typically associate with one or more antennas 108 to provide remote communications with a transponder. The dispenser control system 80 communicates with the central control system 50 in the backroom 26.

In like fashion, the convenience store transaction electronics shown in Figure 6, and more specifically the transaction terminal register 30, include a store transaction controller 152, associated memory 154, the interrogator 54, and a display and key pad 150, 160 forming a transaction terminal interface. The transaction controller 152 interacts with the central control system 50 through the central site control interface 160. The interrogator 54 includes a receiver 162 and a transmitter 164, both of which are associated with one or more antennas 166. The transaction terminal 30 is adapted to provide typical transaction functions of a cash register and a card authorization terminal in addition to communicating with transponders within the store and/or proximate to the terminal. The communications between the

transponder and the store transaction terminal are generally related to transactional and customer identification and monitoring, although other features will become apparent to those skilled in the art upon reading this disclosure.

Attention is now drawn to Figure 7 and the schematic outline of the QSR electronics shown therein. The QSR will generally have a controller 168 and associated memory 170 capable of interfacing with the central control system 50 through a central site control interface 172. As with many QSR's, a transaction terminal or register 174 is provided having a key pad 176 and display 178. The QSR transaction terminal 174 is used by a QSR operator to take customer orders from within the store in conventional fashion. The orders are either verbally or electronically communicated to the food preparation area 40 through the QSR controller 168. The QSR transaction terminal 174 is associated with interrogator 56 having a receiver 177 and a transmitter 179 associated with one or more antennas 175. The food preparation area will typically have a food preparation interface 42 having a display 180 and a key pad 182. The food preparation interface 42 may be a terminal run from the QSR controller 168 or may contain a food preparation controller 184 within the food preparation interface 42. However the system is arranged, order information is passed from one of the order interfaces to the food preparation display 180 to alert food preparers of an order.

In a QSR embodiment providing drive-thru capability, a remote order entry interface 186 is provided. The order entry interface 186 may include a simple menu board and audio intercom system 188, or in a more sophisticated embodiment, may provide for bi-directional video intercom using the audio intercom 188 and a video system 190 allowing the customer and

QSR operator to audibly and visually interact with one another during order placement. The order entry interface 186 may also include an interrogator 60 having a receiver 192 and a transmitter 194, associated with one or more antennas 195, for communicating with a transponder of a customer when the customer is placing an order at the order entry interface 186.

Typically, orders placed at the order entry interface 186 are sent to the order pick-up interface 196, which is normally situated proximate to the pick-up window 36 at the end of the drive-thru lane. The order pick-up interface 196 will have an audio system 198 to provide the audio intercom and an optional video system 200 if video intercom with the order entry interface 186 is desired. The order pick-up interface 196 also has an associated interrogator 58 having a receiver 202 and a transmitter 204 associated with one or more antennas 206.

Unlike existing QSR's, the present invention may include a customer position detector 208, preferably placed somewhere along the drive-thru lane to detect when a customer is at or is past that position en route to pick up an order, which may have been placed at a fuel dispenser 18. The customer position detector 208 is associated with the drive-thru position interrogator 62 and includes a receiver 210 and a transmitter 212 associated with one or more antennas 214.

Figure 8 depicts the basic outline of the car wash electronics, which includes a controller 216, memory 218, a key pad 220, a display 222 and the interrogator 51. The key pad 220 and display 222 combine with the controller 216 to provide a customer interface 48. The

interrogator 51 includes a receiver 224 and a transmitter 226 associated with one or more antennas 228. Additionally, the car wash controller 216 preferably communicates with the central control system 50 in the store via a central site control interface 230. The interrogator 51 will typically communicate with a customer transponder to automatically authorize a car wash previously paid for at the dispenser or inside the store. The key pad may be used to insert a secret code or other information to select a type of wash or otherwise authorize the car wash.

Figure 9 generally depicts the central control system 50 found in the backroom 26 of the fueling environment 10. The central control system 50 may include one or more controllers 232 associated with memory 234. The central control system 50 may include multiple interfaces with the various areas in the fueling environment 10. These interfaces include the car wash interface 230, dispenser interface 146, QSR interface 172 and the vending interface 236 connected to an automated vending machine 28. Additionally, the central controller 232 may have a dedicated network or authorization interface 238 connected to a host transaction network 94 for authorizing credit and debit transactions and the like. An Internet interface may also be provided for transactions and other information relating to operation, advertising, merchandising and general inventory and management functions.

The dedicated authorization interface and/or Internet interface may operate on a dedicated service line or a telephone system 242. Furthermore, the central control system 50 may have a direct operator interface 244 associated with the controller 232 to allow an operator to interact with the control system. In more advanced embodiments, a central positioning

interface 246 associated with multiple antennas 248 may be used to determine transponder position and location throughout the fueling environment.

Multistage Ordering

One of the many unique aspects of the present invention is providing for monitoring customer position throughout the fueling environment in order to associate orders placed at the fuel dispenser with the particular customer that placed the order at the appropriate receiving point, such as the QSR drive-thru terminal and window 36, QSR transaction terminal 34 in the store, or, in the case of a car wash, at the car wash interface 48. In addition to associating the customer picking up the order with the appropriate order, the QSR can monitor or detect the position of the customer in the drive-thru line or elsewhere in the fueling environment to determine when to start order preparation.

For example, during the fueling operation, the customer may decide to order a few items from the QSR menu displayed at the dispenser 18. As the customer enters the order, the order is associated with the transponder carried by the customer or mounted on the customer's vehicle. The customer may choose to pay for the order along with the fuel at the dispenser, at the order pick-up place at the drive-thru window, or at one of the in-store registers associated with the QSR or the convenience store. Continuing with our example and assuming the transaction was paid for at the dispenser along with the fuel, the customer will enter his vehicle and proceed to drive around the fuel station store along the drive-thru lane and pass the customer position monitor 46. As the customer approaches the customer position monitor 46, the

drive-thru position interrogator 62 will receive a signal from the customer transponder indicating the customer is at a known position in the drive-thru lane. At this point, the QSR control system 168 will alert the food preparation area 40 to prepare the order and indicate to the order pick-up interface and controller 196 the position of the customer in the drive-thru lane. Once the customer reaches the order pick-up window, the order pick-up interrogator will determine the presence of the customer transponder and associate the customer's order accordingly so that the drive-thru window operator can deliver the freshly prepared order to the correct customer.

Flow charts 10A and 10B represent the basic flow of various multistage ordering processes. The process begins (block 500) when the dispenser interrogator 52 receives a signal from a transponder 12, 14 and the dispenser control system 80 forwards transponder identification indicia (ID) to the central control system 50 for authorization (block 502). Authorization may occur locally at the central site controller 232 or at a remote host authorization network. The information to be authorized is generally financial or account information and can either be transmitted with the transponder ID or stored at the central control system 50 or the host network 94 in association with the transponder ID. In the latter case, either the host network 94 or the central control system 50 will associate the ID with the stored account information and then authorize the transponder based on the correlated account information. Preferably, the transponder is read and authorized as the customer and/or vehicle approaches or initially stops at the fueling position and preferably, at least, before a transaction is initiated to increase transaction efficiency. As the customer fuels the vehicle, the dispenser may display various types of information including advertising and instructional information. Preferably, the

dispenser 18 will display options for ordering food items from the QSR or ordering a car wash at the car wash 24 (block 504). The dispenser 18 will determine whether an order is placed (block 506). The dispenser 18 will receive any orders placed by the customer (block 508) and associate the order with the transponder in some fashion (block 510). Typically, the order is associated with a transponder by (1) associating the order with the transponder ID at one of the control systems, (2) transmitting and storing a code associated with the order on the transponder, or (3) actually storing the order on the transponder. Those of ordinary skill in the art will recognize that there are many variations available for associating an order with a transponder. These variations are considered within the scope of this disclosure and the claims that follow.

Although there are various options, two general methods for associating an order with a transponder will be discussed below. With the first, no information is transmitted to the transponder relating to the order. Instead, the electronics at the dispenser 18, central control system 50 or the QSR 22 stores the order information and associates the order with the transponder ID. When one of the interrogators subsequently reads the transponder ID, the pertinent system will correlate the order with the transponder ID. The second method involves writing information to the transponder at the dispenser 18 and subsequently transmitting that information to one of the system interrogators for authorization or order identification. The information written to the transponder may range from a code for identification authorization purposes to the complete order placed at the dispenser.

Returning to Figure 10A, the basic flow of both of the above-discussed methods are shown. In cases where one of the control systems associates an order based on the transponder ID, the

customer order is transferred to the QSR controller 108 through the central control system 50 (block 512). The dispenser 18 will effect payment for the transaction (typically adding the QSR purchase total to the fueling charge) and the QSR controller 168 will alert the food preparation area to prepare the order (block 514).

In a basic environment, the QSR order pick-up interface 198 will monitor for the presence of a transponder through the drive-thru pick-up interrogator 58 or the in-store QSR transaction terminal interrogator 56 (block 516). If a transponder is not detected, the systems continue to monitor for a transponder (block 518). Once a transponder is detected, the transponder ID is received (block 520) and the transponder ID is associated with the appropriate order (block 522). At this point, the QSR operator located at the pick-up window or the in-store transaction terminal is informed of the order corresponding to the customer at the window or terminal (block 524) and the fueling and retail transaction for that particular customer ends (block 526).

Alternatively, once a customer places an order and the dispenser 18 receives the order (block 508), and the order is associated with the transponder (block 510), the dispenser 18 may transmit order indicia, such as a code for the order itself, to the transponder for storage (block 528). Next, the dispenser 18 will effect payment for the transaction as discussed above (block 530). In the more basic embodiment discussed above, the QSR interrogators associated with the QSR window or in-store terminal will monitor for the presence of a transponder (block 516 and 518), receive the transponder order indicia (block 518), and associate the order with the indicia received from the transponder (block 522). The operator is then informed of the

order for that particular customer (block 524).

In any of the above embodiments, the customer position detector 46 may be used to alert QSR operators of the approach and location in the drive-thru line of a particular customer. For the sake of clarity, the process of Figure 10A only depicts using the customer position detector 46 in a process where order indicia is transmitted to the transponder. Please note that using the customer position detector 46 may be used in any of the embodiments, as those of ordinary skill in the art will appreciate.

Once the order is placed, received and associated with the transponder in normal fashion (blocks 500-510), indicia of the order is transmitted to the transponder (block 528) and the transaction is effected (block 530) in normal fashion. At this point, the customer position detector 46 will monitor for the presence of a transponder via the interrogator 62 (blocks 532 and 534). Once a transponder is detected, the customer position detector 46 will forward the transponder indicia to the food preparation area 40 through the QSR controller 108. This allows for the food preparation operators to timely prepare a customer order based on the customer's approach to the pick-up window (block 536). This information may also be sent to the pick-up operator to indicate customer position. The customer will proceed along the drive-thru lane until the pick-up window is approached where the transponder is detected by the order pick-up interrogator 58 (blocks 516 and 518). The transponder ID or indicia is received by the QSR electronics, and the operator is informed of the order corresponding to the customer at the window (blocks 522-526).

The multistage ordering works equally well with QSR's and car wash systems. When a car wash is ordered at the dispenser, the particular car wash ordered is associated with the transponder at the dispenser and subsequently reassociated when the customer approaches the car wash area 24 and is interrogated by the car wash interrogator 51. In the preferred embodiment, the dispenser operates in conjunction with the central control system 50 to provide authorization of the car wash purchased at the dispenser. When the customer is at the car wash 24, the customer's transponder is interrogated for an ID or a code, which the car wash controller and/or the central control system 50 recognizes as preauthorized. If additional security is necessary on any of these embodiments, the customer may receive a code or other indicia, which they are required to enter or submit when the corresponding goods or services are received.

Furthermore, the fuel dispenser 18 is not the only point of sale where ordering may take place. A customer having a transponder may, for instance, order a car wash in conjunction with placing an order at the in-store QSR terminal or the convenience store terminal while purchasing food or other merchandise. The interrogators at either of these terminals can just as easily associate the car wash with the customer transponder and operate through the central control system 50 to subsequently reassociate the customer and the car wash ordered at the car wash interface 48. The multistage ordering disclosed herein provides a solution for keeping track of various transactions in a fueling environment where customer orders are picked up in locations separate from where they are placed and very likely may not be picked up in the order they were placed.

Certain modifications and improvements will within the scope of the following claims occur to those skilled in the art upon a reading of the foregoing description.

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Claims

1. A forecourt ordering system comprising:

a. a remote communications unit associated with a customer.

b. an order entry user interface for accepting an order from a customer and identifying it with the remote communications unit associated with the customer.

c. an order receipt position, remote from the order interface, having a communications device for receiving the customer order from the order interface, and a communications device for receiving a communication relating to the position of the remote communications unit, further comprising processing means to match the order received from the order interface with the communication relating to the position of the remote communications unit so that an order can be associated with the customer at the order receipt position.

2. A system as claimed in Claim 1 comprising a fuel dispenser wherein the order entry interface is at the fuel dispenser.

3. A system as claimed in Claim 1 wherein the order entry interface is located within a vehicle with which the remote communications unit is associated.

4. A system as claimed in Claim 3 further comprising a fuel dispenser wherein the remote communications unit is associated with a fuelling transaction at the fuel dispenser.

5. A system as claimed in Claim 4 wherein the remote communications unit communicates with a receiver and or transmitter associated with a fuel dispenser.

6. A system as claimed in Claim 3,4, or 5 wherein the order interface has a display and input device located within a vehicle cabin, said order interface adapted to provide a selection of items to order and receive an order via said input device; the system further comprising:

a. vehicle communication electronics associated with said order interface and adapted to wirelessly transmit the order for ultimate receipt at the order receipt position.

b. a control system configured to display said selection of items to order on said display, determine the order based on occupant input received via said input device, and effect wireless transmission of the order.

7. A system as claimed in Claim 2,4,5 or 6 wherein payment for goods or services to be received from the order receipt position is combined with payment for a fuelling transaction.

8. A system as claimed in Claim 2 wherein

a) the fuel dispenser has associated first communications electronics adapted to communicate with the remote communications unit.

b) the order receipt position has:

i) second communications electronics adapted to communicate with the remote communications unit associated with the customer, and

ii) an output indicating the customer who placed the order is at the order receipt position;

c) the system further comprising a control system associated with said order interface, said first and second communications electronics and said output of said order receipt position, said control system adapted to:

i) communicate with the remote communications unit through said first communications electronics when said remote communications unit is proximate said fuel dispenser;

ii) associate a customer order placed at the order interface with the remote communications unit;

iii) communicate with the remote communications unit through said second communications electronics when said remote communications unit is proximate said order receipt position; and

iv) identify the order at the order receipt position associated with the remote communications unit of the customer who placed the order at the order entry interface of the fuel dispenser and provide said output indicating the customer who placed the order is at the order receipt position.

9. A system as claimed in Claim 8 wherein data transmitted to said first and second communications electronics includes a remote communications unit identifier and said control system associates the customer order with the identifier.

10. A system as claimed in Claim 8 or 9 wherein said control system is adapted to:

a) provide order identification data and have said first communications electronics transmit said order identification data to the remote communications unit when the order is placed at the fuel dispenser; and

b) receive the order identification data from the remote communications unit via said second communications electronics to identify the customer at said order receipt position.

11. A system as claimed in any one of Claim 8, 9 or 10 wherein said control system is associated with a remote payment/authorisation network and said fuel dispenser further includes a card reader adapted to read payment cards and transmit card data from the cards to the payment/authorisation network to facilitate payment of fuel and the order.

12. A system as claimed in any one of Claims 8 to 11 wherein said control system includes a dispenser controller located with said fuel dispenser and adapted to operate said order entry user interface and said communications electronics.

13. A system as claimed in any preceding claim wherein said order receipt position includes an automatic car wash wherein the customer may order a car wash at the order interface and said processing means will activate said car wash when the customer is an appropriate location proximate to said order receipt position.

14. A system as claimed in any preceding claim wherein said order receipt position includes a restaurant or store wherein the customer may order food or drink at the order interface and pick up the food order at said order receipt position.

15. A system as claimed in any preceding claim wherein said order receipt location includes a vending machine wherein the customer may order food or drink at the order interface and pick up the food order at said order receipt position.

16. A system as claimed in any one of claims 8 to 12 further comprising:

a) an intermediate locating position located on a path of travel between said fuel dispenser and said order receipt position, said intermediate locating position having third communications electronics adapted to communicate with the remote communications unit; and

b) a control system associated with: said order interface; said first communications electronics of said fuel dispenser; said third communications electronics of said intermediate locating position; and said second communications electronics; and said output of said order receipt position, said control system adapted to:

i) communicate with the remote communications unit through said first communications electronics when said remote communications unit is proximate said fuel dispenser;

ii) associate a customer order placed at the order entry user interface with the remote communications unit associated with the customer;

iii) communicate with the remote communications unit through said third communications electronics when said remote communications unit is proximate said intermediate locating position indicating said customer

is near said intermediate locating position;

iv) provide said intermediate location output indicating the customer is proximate said intermediate locating position;

v) communicate with the remote communications unit through said second communications electronics when said remote communications unit is proximate said order receipt location; and

vi) identify the order at the order receipt position associated with the remote communications unit of the customer who placed the order at the order entry interface of the fuel dispenser and provide said output indicating the customer who placed the order is at the order receipt position.

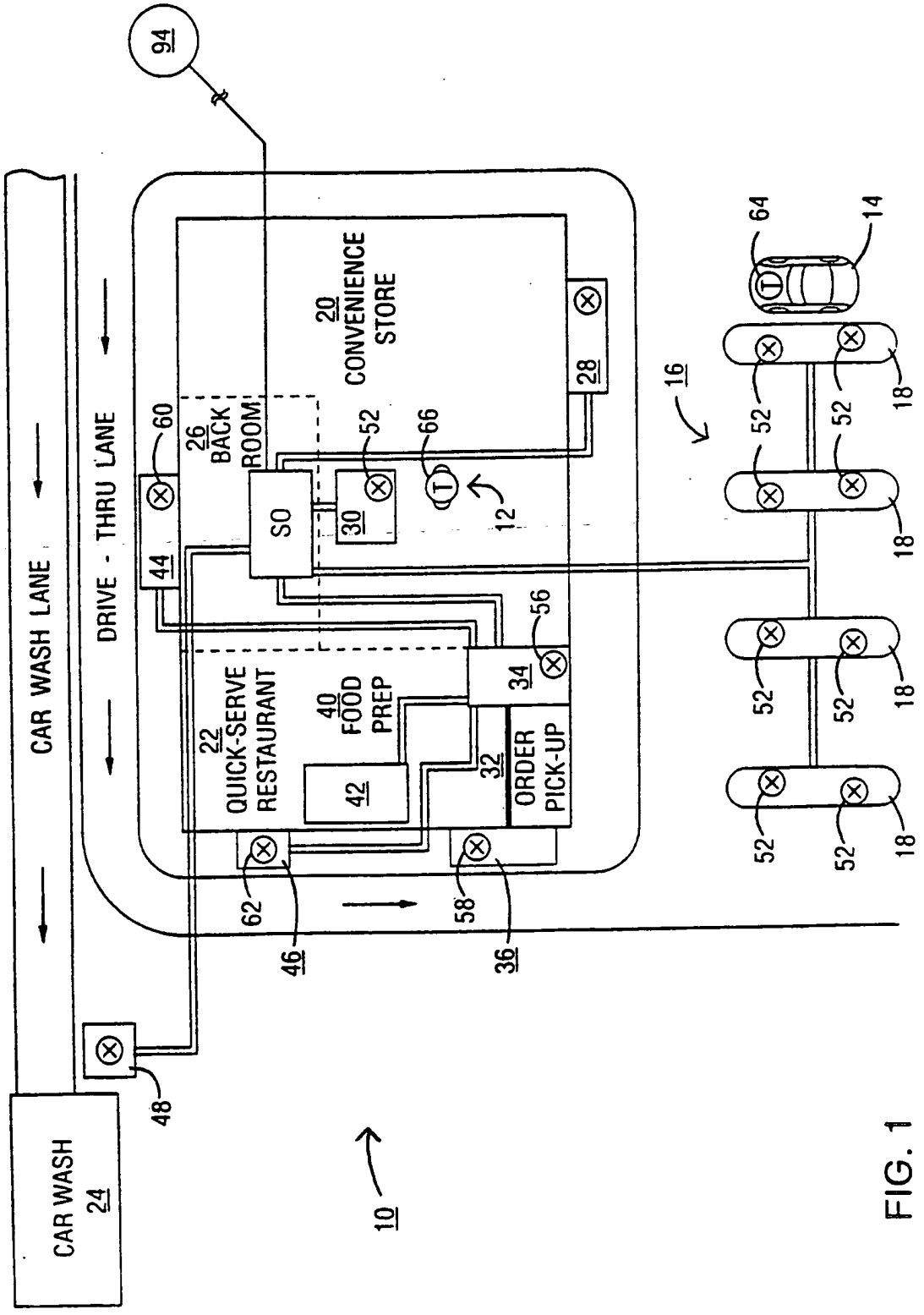
94
CAR WASH LANE
DRIVE - THRU LANE
20 CONVENIENCE STORE
26 BACK ROOM
22 QUICK-SERVE RESTAURANT
40 FOOD PREP
42
32
ORDER PICK-UP
34
SO
30
28
44
60
52
66
56
62
58
46
36
48
CAR WASH 24
10
12
16
64
14
18

FIG. 1

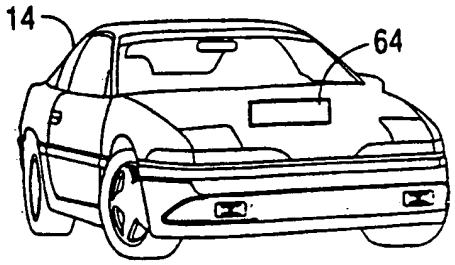

FIG. 2A

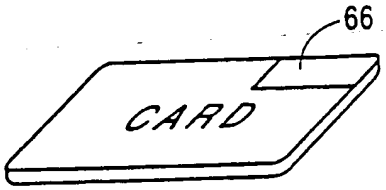

FIG. 2B

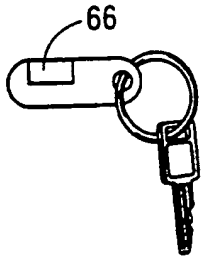

FIG. 2C

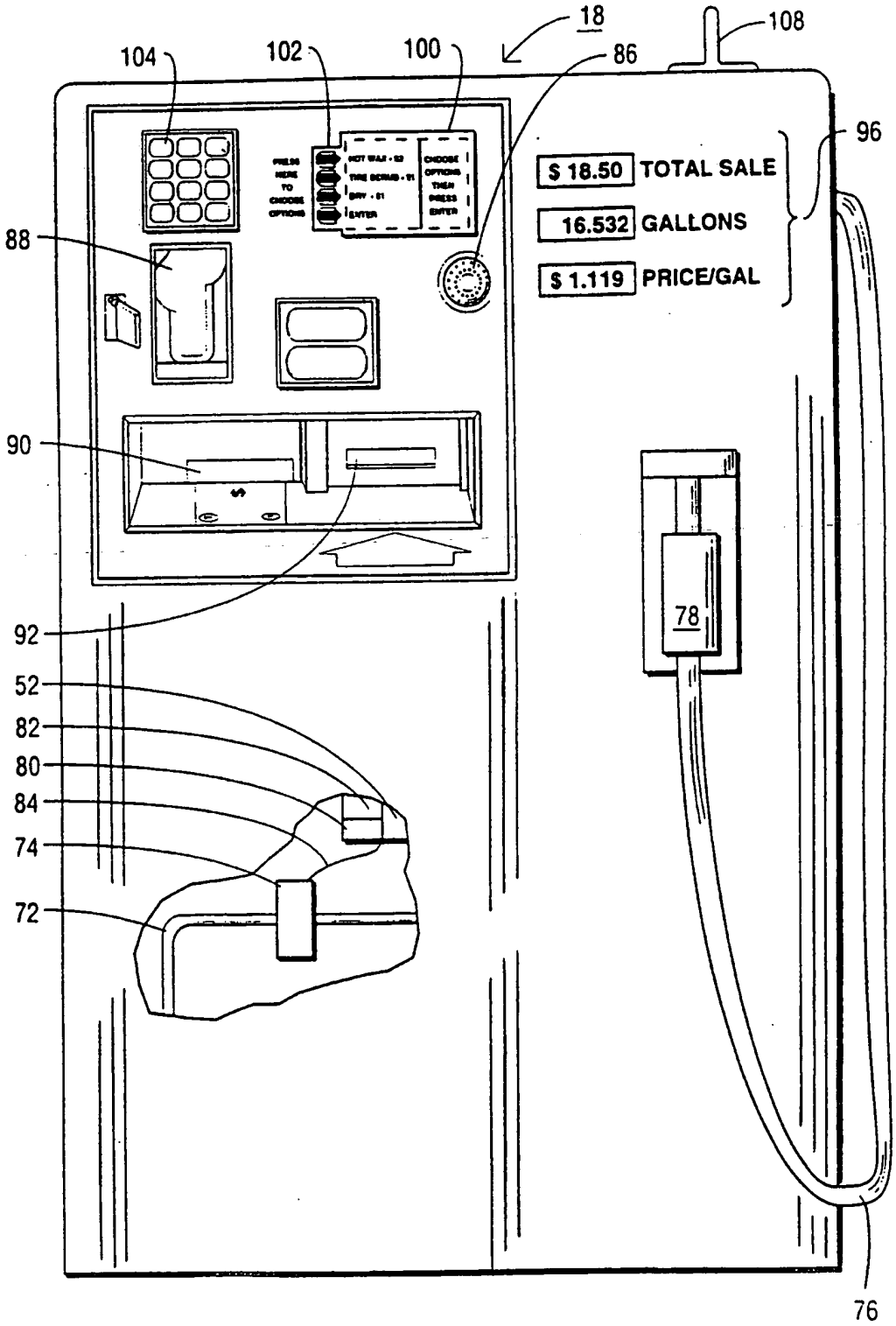
18
108
104
102
100
86
96
$ 18.50 TOTAL SALE
16.532 GALLONS
$ 1.119 PRICE/GAL
88
90
92
52
82
80
84
74
72
78
76

FIG. 3

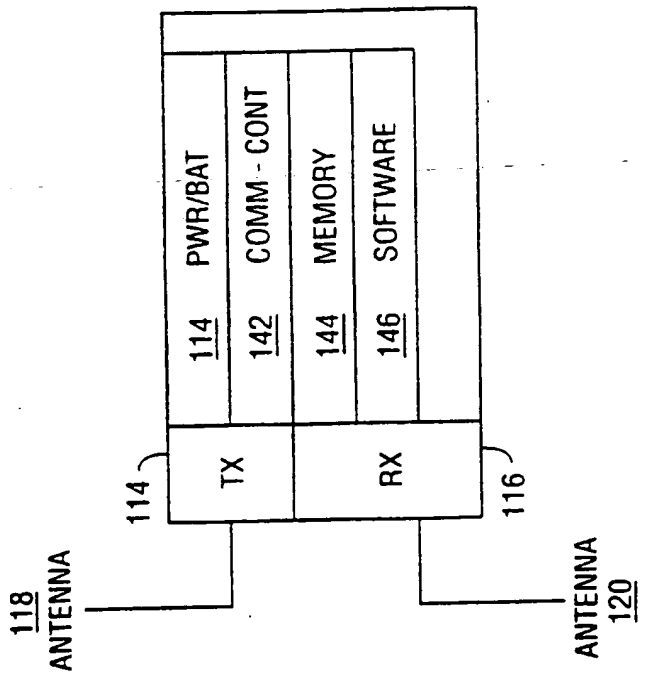
114 PWR/BAT
142 COMM - CONT
144 MEMORY
146 SOFTWARE
114
TX
RX
116
118
ANTENNA
ANTENNA
120

FIG. 4

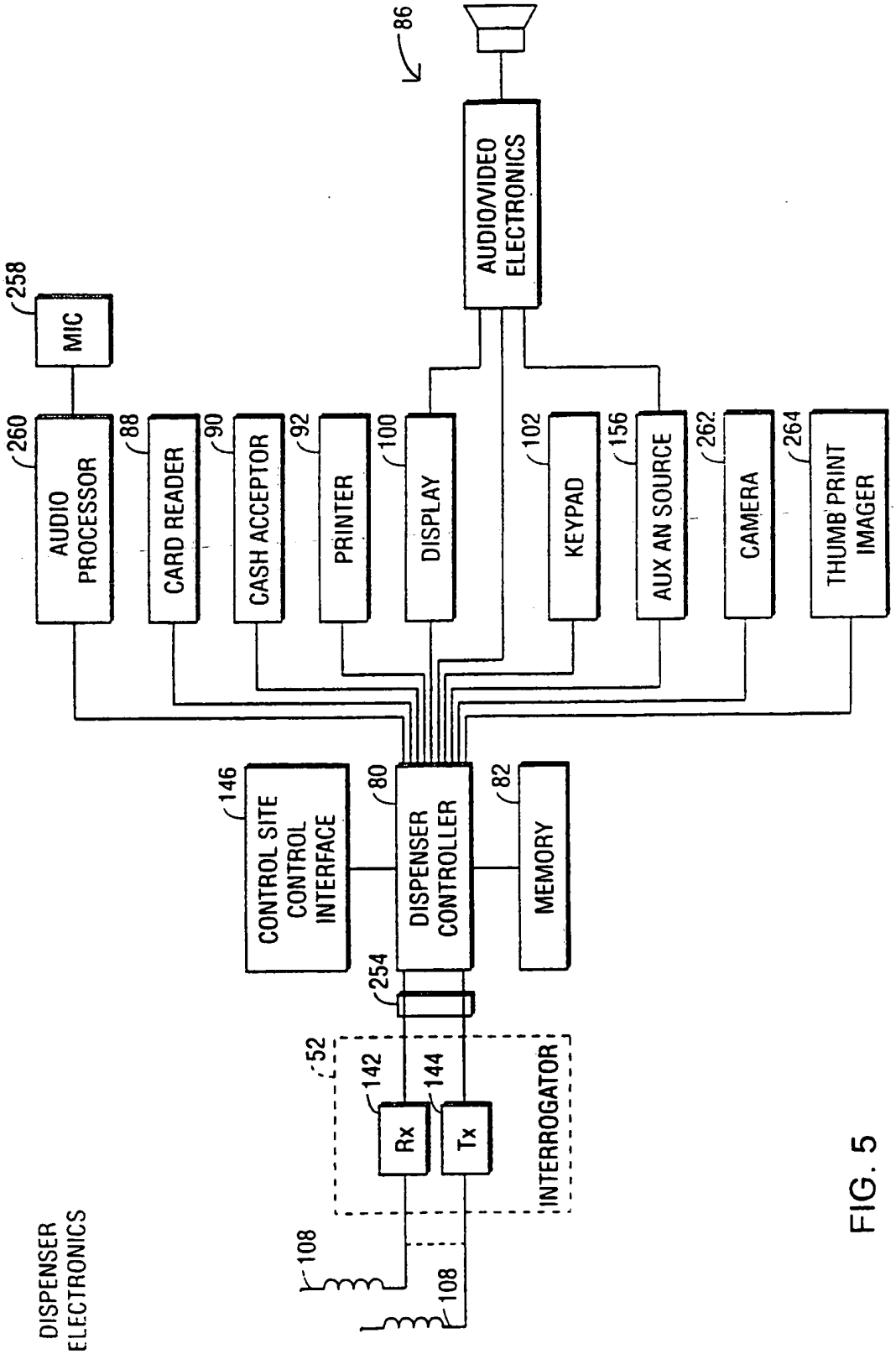
86
AUDIO/VIDEO ELECTRONICS
258
MIC
260
AUDIO PROCESSOR
88
CARD READER
90
CASH ACCEPTOR
92
PRINTER
100
DISPLAY
102
KEYPAD
156
AUX AN SOURCE
262
CAMERA
264
THUMB PRINT IMAGER
146
CONTROL SITE CONTROL INTERFACE
80
DISPENSER CONTROLLER
82
MEMORY
254
52
142
144
Rx
Tx
INTERROGATOR
108
108
DISPENSER ELECTRONICS

FIG. 5

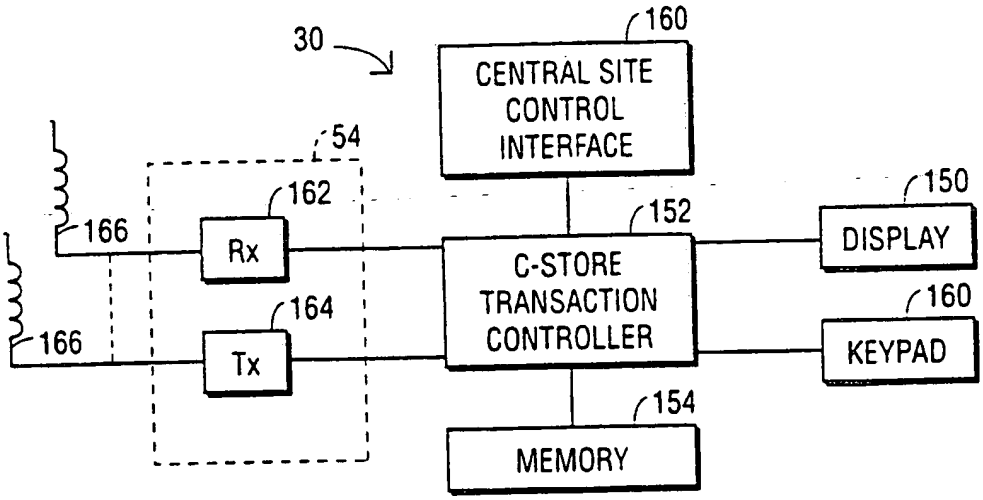
30
160
CENTRAL SITE CONTROL INTERFACE
54
162
166
Rx
152
150
DISPLAY
C-STORE TRANSACTION CONTROLLER
164
160
166
Tx
KEYPAD
154
MEMORY

FIG. 6

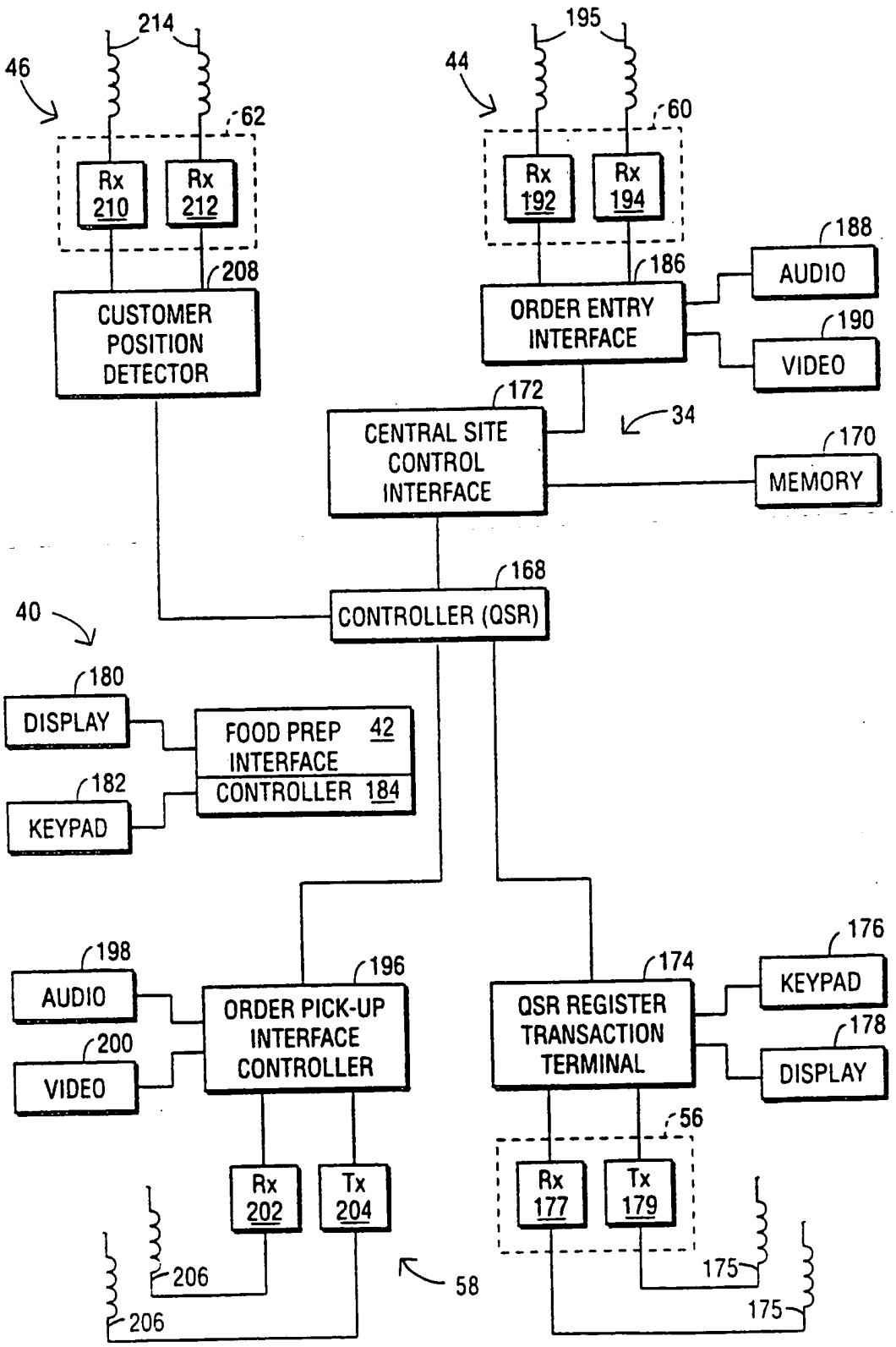
214
46
62
Rx 210
Rx 212
208
CUSTOMER POSITION DETECTOR
195
44
60
Rx 192
Rx 194
188
AUDIO
186
ORDER ENTRY INTERFACE
190
VIDEO
172
CENTRAL SITE CONTROL INTERFACE
34
170
MEMORY
168
CONTROLLER (QSR)
40
180
DISPLAY
FOOD PREP INTERFACE 42
CONTROLLER 184
182
KEYPAD
198
AUDIO
196
ORDER PICK-UP INTERFACE CONTROLLER
200
VIDEO
174
QSR REGISTER TRANSACTION TERMINAL
176
KEYPAD
178
DISPLAY
56
Rx 177
Tx 179
Rx 202
Tx 204
206
206
58
175
175

FIG. 7

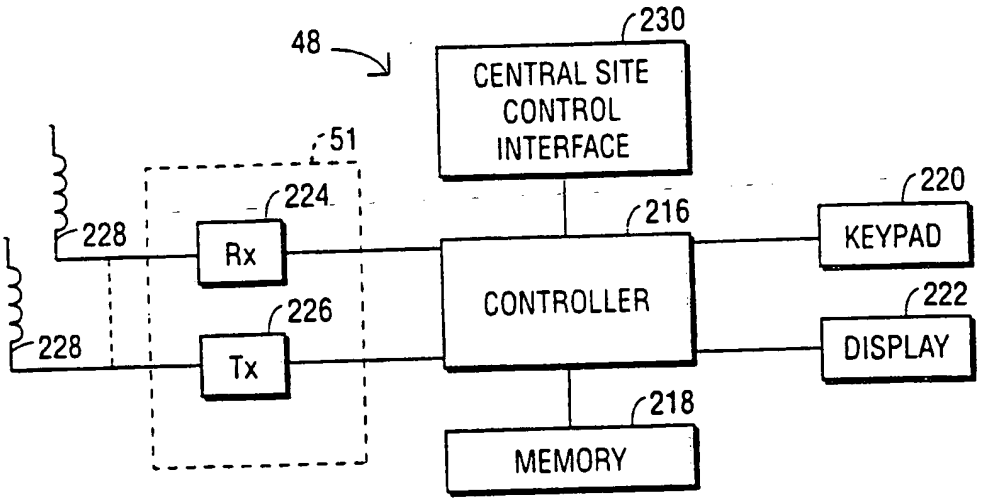
48
230
CENTRAL SITE CONTROL INTERFACE
51
224
228
Rx
216
220
KEYPAD
CONTROLLER
226
222
228
Tx
DISPLAY
218
MEMORY

FIG. 8

CENTRAL SITE CONTROLLER ELECTRONICS

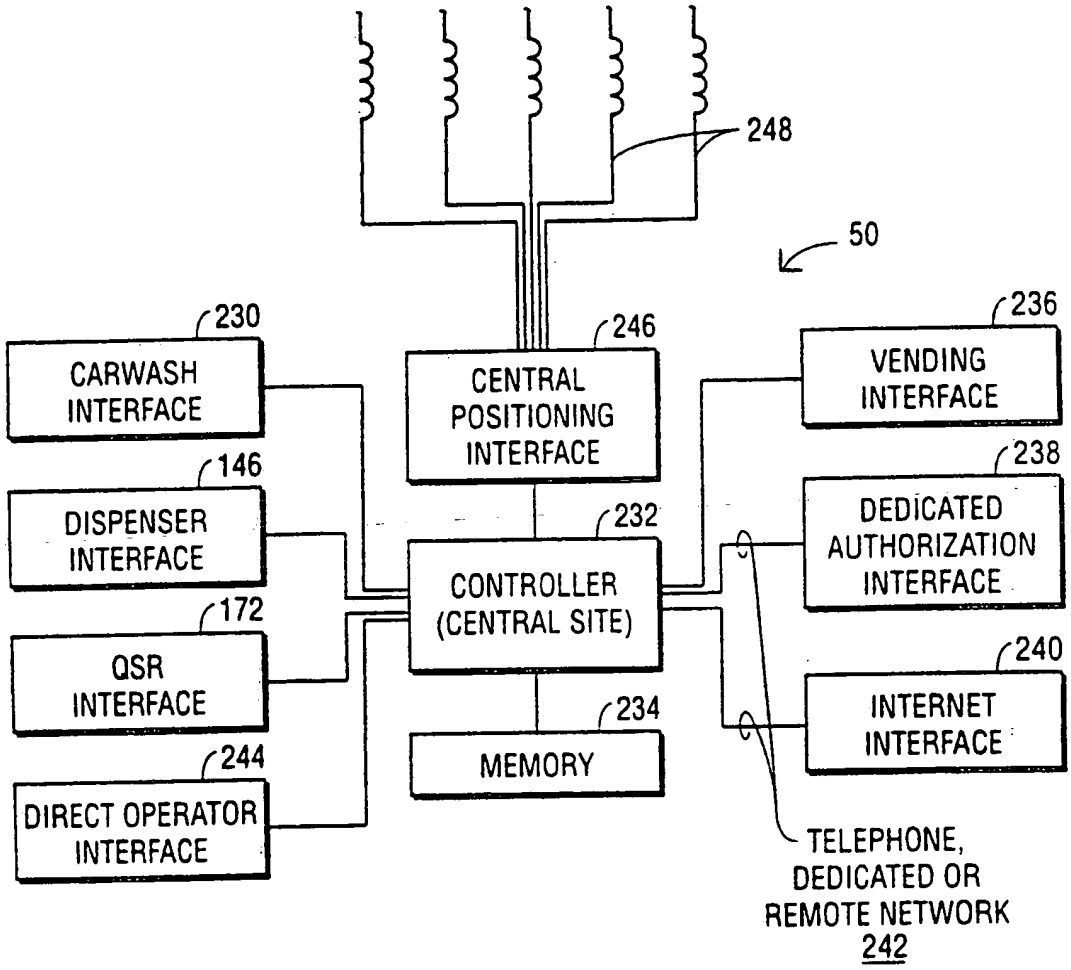

FIG. 9

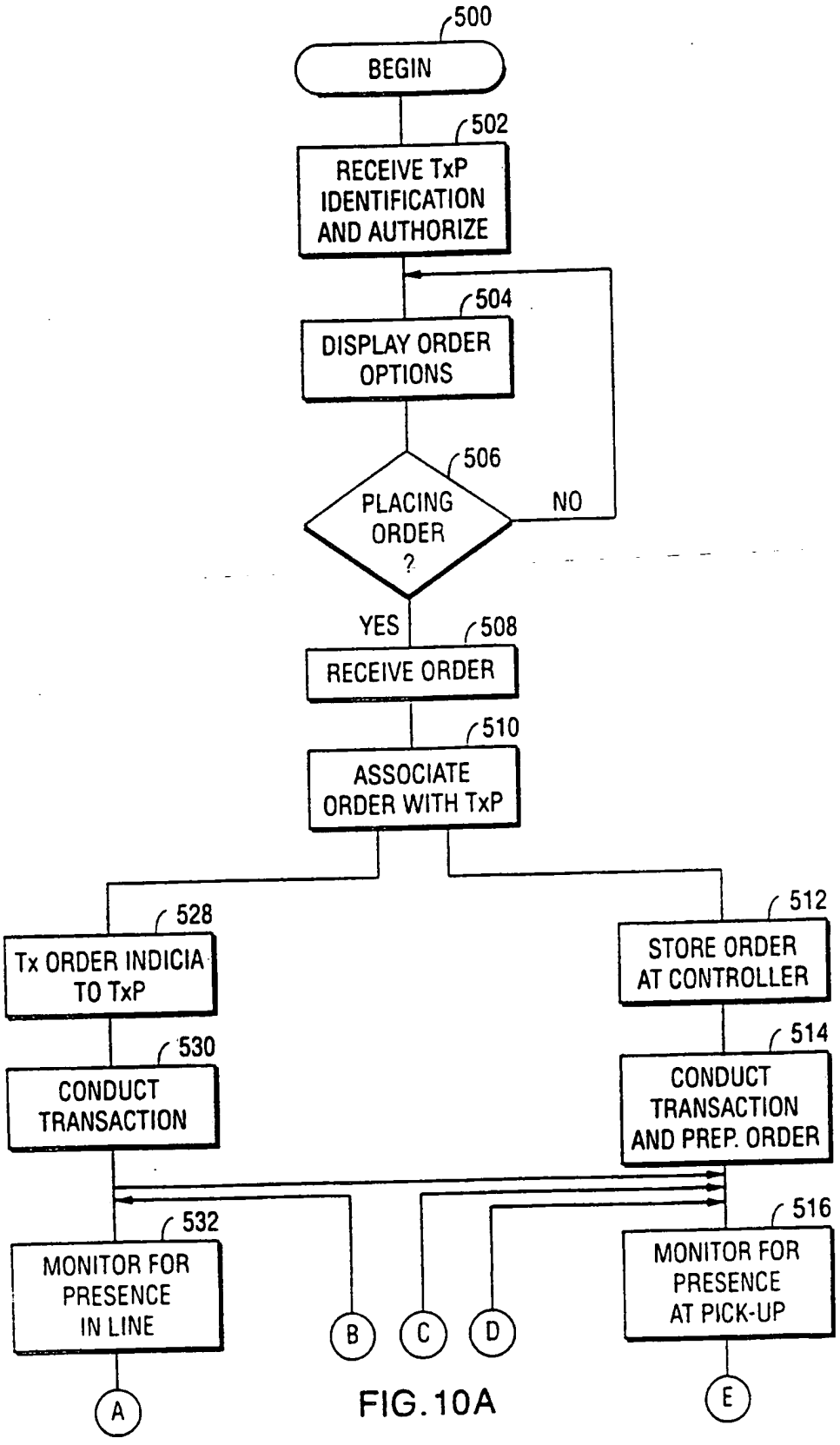
500
BEGIN
502
RECEIVE TxP IDENTIFICATION AND AUTHORIZE
504
DISPLAY ORDER OPTIONS
506
PLACING ORDER ?
NO
YES
508
RECEIVE ORDER
510
ASSOCIATE ORDER WITH TxP
528
Tx ORDER INDICIA TO TxP
530
CONDUCT TRANSACTION
512
STORE ORDER AT CONTROLLER
514
CONDUCT TRANSACTION AND PREP. ORDER
532
MONITOR FOR PRESENCE IN LINE
516
MONITOR FOR PRESENCE AT PICK-UP
A
B
C
D
E

FIG. 10A

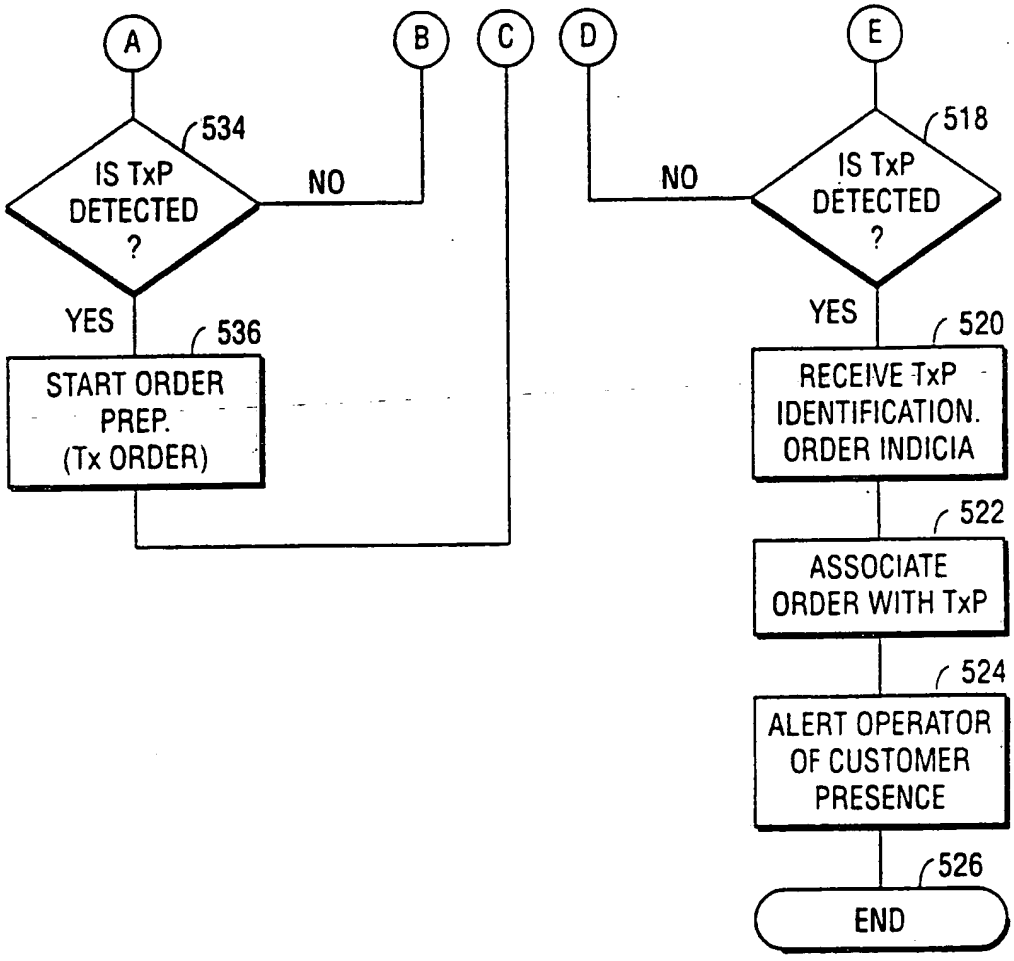
A
B
C
D
E
534
IS TxP DETECTED ?
NO
YES
536
START ORDER PREP. (Tx ORDER)
518
IS TxP DETECTED ?
NO
YES
520
RECEIVE TxP IDENTIFICATION. ORDER INDICIA
522
ASSOCIATE ORDER WITH TxP
524
ALERT OPERATOR OF CUSTOMER PRESENCE
526
END

FIG.10B

INTERNATIONAL SEARCH REPORT

Int ional Application No
PCT/GB 98/02919

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B67D5/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B67D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5 383 500 A (DWARS SICCO ET AL) 24 January 1995 see abstract see column 1, line 25 - column 2, line 55; figures 1-4	1-6, 8-10,12 7,11,13
Y	US 4 881 581 A (HOLLERBACK JAMES A) 21 November 1989 see column 1, line 4 - line 19; figures 1,2	7,13
Y	DE 40 13 147 A (SCHREIBER HANS) 31 October 1991 see column 2, line 16 - line 45; figures 1,2	11

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
2 December 1998	14/12/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Müller, C

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 98/02919

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 461 888 A (EXXON RESEARCH ENGINEERING CO) 18 December 1991 see column 1, line 1 - column 2, line 34	1,2,4,5
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A	WO 95 32919 A (GUNNARSSON STAFFAN) 7 December 1995	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Ional Application No
PCT/GB 98/02919

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